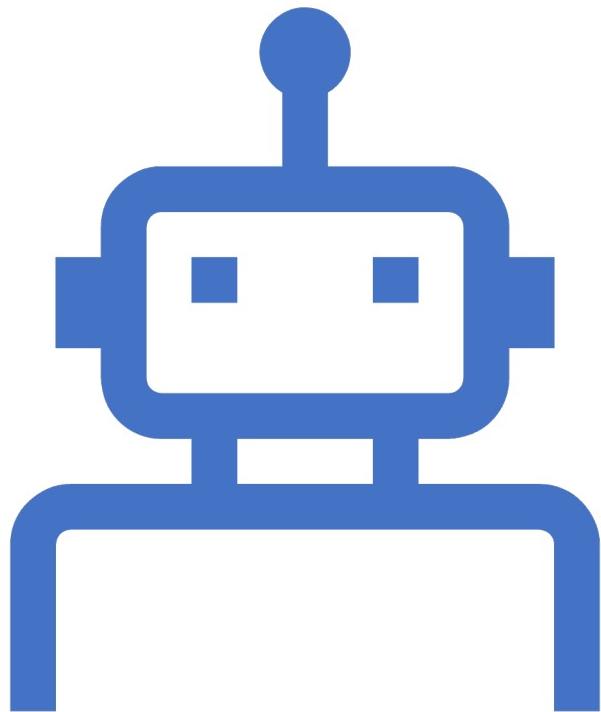


Notes from Gen AI session

Dr. Asma R Shora

Ice Breaker



Use ChatGPT to create ice-breakers 😊

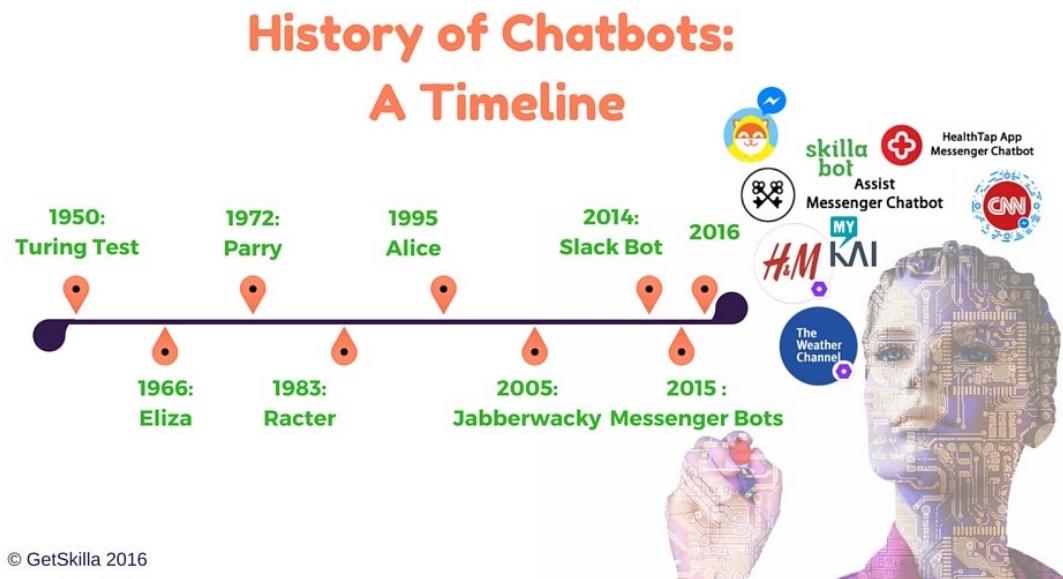
Create your own account.

Watch how ?

<https://www.youtube.com/watch?v=9HtgDtpo2co>

History of AI: ELIZA – The first Chatbot

- <https://web.njit.edu/~ronkowit/eliza.html>

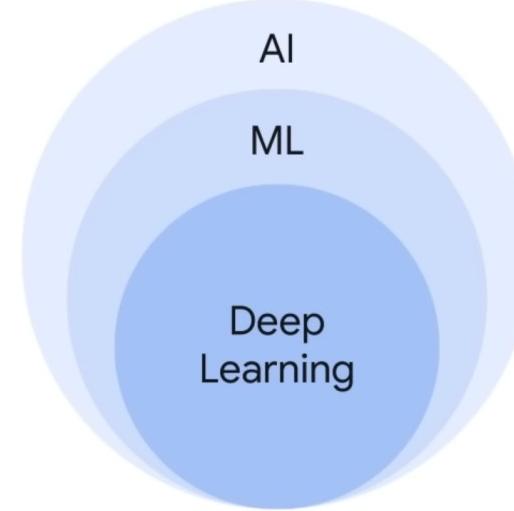


ELIZA is an early natural language processing computer program created from 1964 to 1966 at the MIT Artificial Intelligence Laboratory by Joseph Weizenbaum.

What is Machine Learning?



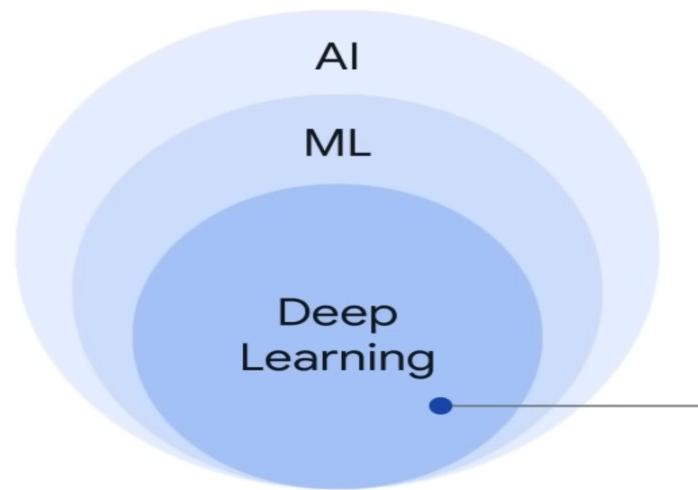
Artificial Intelligence
is a discipline



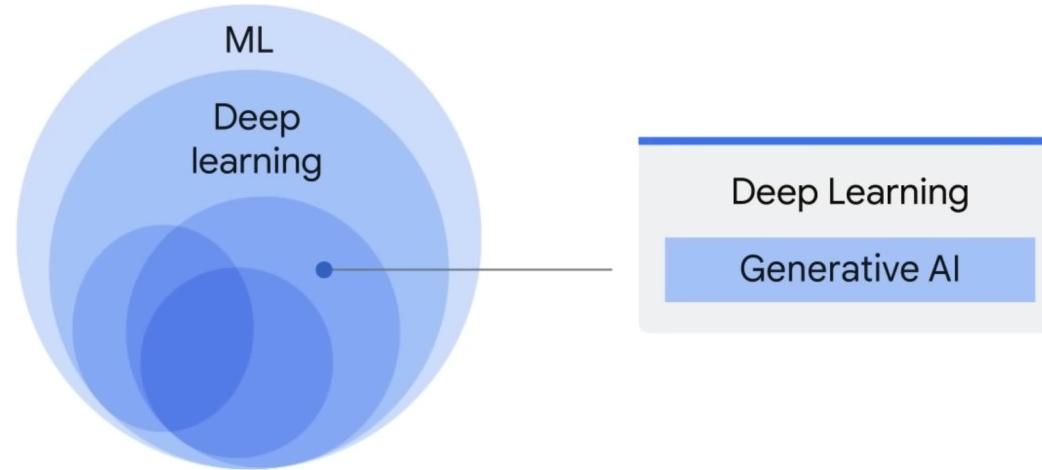
Machine Learning



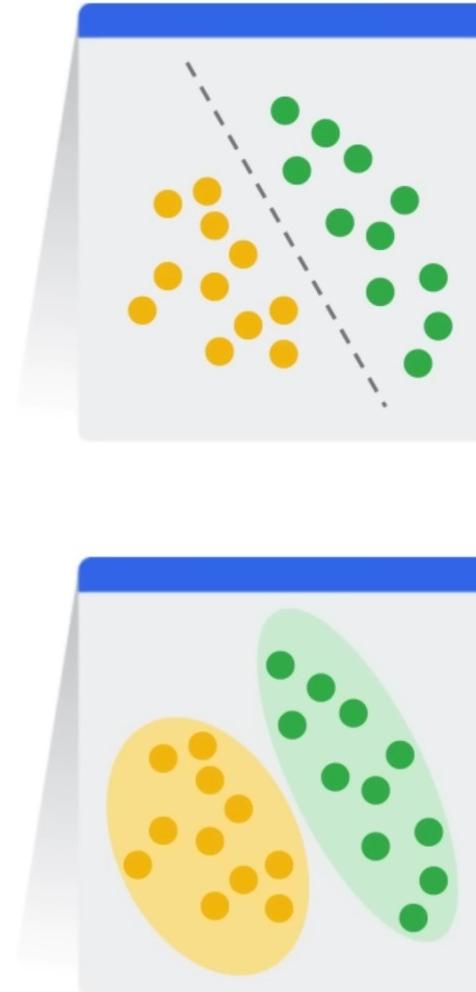
**Deep learning is
a subset of ML**



Generative AI
is a **subset of**
Deep Learning



Deep Learning Model Types



Discriminative

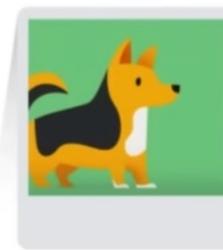
- Used to classify or predict
- Typically trained on a dataset of labeled data
- Learns the relationship between the features of the data points and the labels

Generative

- Generates new data that is similar to data it was trained on
- Understands distribution of data and how likely a given example is
- Predict next word in a sequence



Discriminative
technique

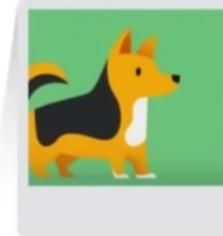


Classify

Discriminative model
(classify as a dog or a cat)



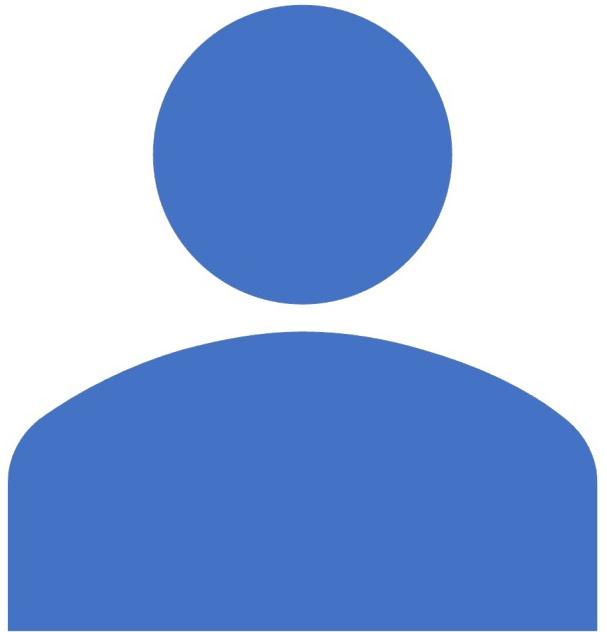
Generative
technique



Generate

Generative model
(generate dog image)





<https://this-person-does-not-exist.com>
How does this work?



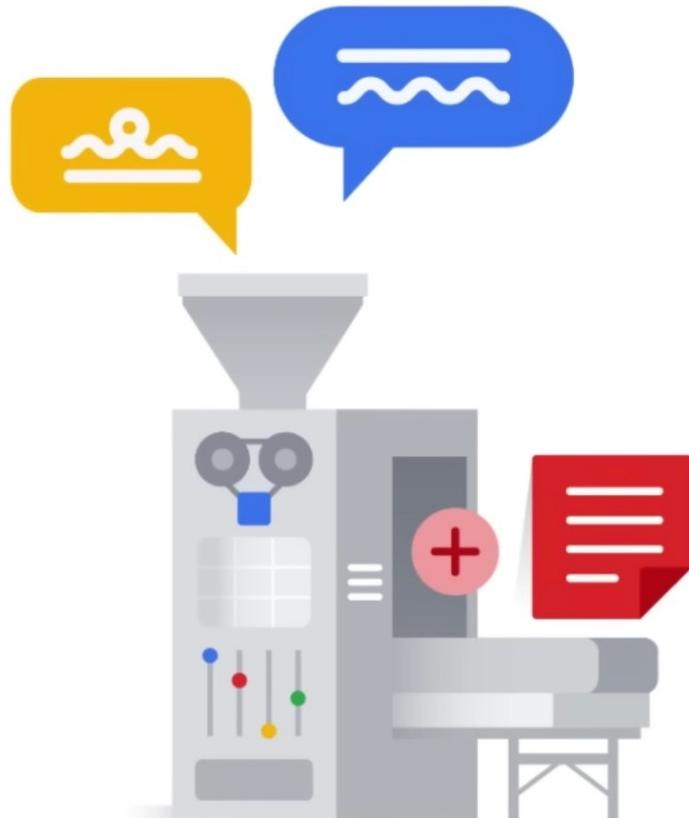
Domains in AI and Gen AI

- Text (NLP)
- Speech (Acoustics + NLP)
- Vision (Images, Animations + Videos)



Multi-model and Multimodal Gen AI

- Multi-model generative AI refers to artificial intelligence systems that can generate content, such as text, images, or other types of data, using multiple modalities or forms of input.
- Multimodal Gen AI - activates multiple senses in HCI
- Apps will become multimodal
- AR/VR/ Metaverse



Generative language models learn about patterns in language through training data.

Then, given some text, they predict **what comes next**.

I'm making a sandwich with peanut butter and I

- jelly.
- jam.
- banana.
- mayonnaise.
- fluff.
- jelly time.
- Nutella.

Bard

I'm making a sandwich with peanut butter and



Sure I can help you with that. Here are some of the most popular spreads to put on a peanut butter sandwich:

- Jelly or jam: Strawberry, grape, raspberry, apricot, peach, blackberry, blueberry, etc.



Great! Peanut butter is a versatile ingredient that pairs well with a variety of other ingredients. What else would you like to add to your sandwich? Common options include:

1. Jelly or jam: Peanut butter and jelly (PB&J) is a classic combination. You can choose from a variety of fruit spreads like grape, strawberry, raspberry, or even mixed berry.
2. Banana slices: Sliced bananas add a sweet and creamy texture to your sandwich. They're a popular choice for those who enjoy a bit of natural sweetness.
3. Honey: Drizzling honey over your peanut butter adds a touch of sweetness and a unique flavor profile.
4. Nutella or chocolate spread: If you want to make your sandwich extra indulgent, consider adding Nutella or another chocolate-hazelnut spread.
5. Marshmallow fluff: For a sweet and gooey twist, you can use marshmallow fluff alongside peanut butter to create a "fluffernutter" sandwich.
6. Apples: Thinly sliced apples add a crisp, refreshing element to your sandwich and provide a nice contrast to the creamy peanut butter.
7. Bacon: If you're feeling adventurous, you can add some crispy bacon for a sweet and savory combination.
8. Cinnamon and sugar: Sprinkling a bit of cinnamon and sugar on your peanut butter can give your sandwich a warm and comforting flavor.
9. Pretzels: Crushed pretzels or pretzel crisps can add a salty crunch to your peanut butter sandwich.
10. Pickles: Some people enjoy adding sliced pickles to their peanut butter sandwiches for a unique blend of sweet and tangy flavors.

Feel free to mix and match these ingredients based on your preferences. Once you've decided what to add, assemble your sandwich by spreading the peanut butter on one slice of bread and adding your chosen toppings. Then, place another slice of bread on top, and you're ready to enjoy your creation!



RE

I am making a sandwich with peanut butter and



jelly! Classic choice! Here's a basic guide on how to make a peanut butter and jelly sandwich:



Ingredients:

1. Bread (usually white or whole wheat, but you can get creative)
2. Peanut butter (smooth or chunky based on your preference)
3. Jelly or jam (grape, strawberry, and raspberry are popular choices, but the sky's the limit)

Instructions:

1. **Preparation:** Lay out all your ingredients and tools. You'll need a butter knife or spreader, and optionally, a cutting board.
2. **Bread Selection:** Grab two slices of bread. If they're fresh from the fridge or a bit firm, you might want to let them sit out for a few minutes to soften, or even lightly toast them for a different texture.
3. **Spread Peanut Butter:** Using your knife, scoop out a generous amount of peanut butter. Spread it evenly over one slice of bread. If you like a lot of peanut butter, go ahead and lay it on thick. If not, a thin layer will do.
4. **Spread Jelly/Jam:** On the other slice of bread, spread your chosen jelly or jam. Again, the

⟳ Regenerate

Send a message



4. **Spread Jelly/Jam:** On the other slice of bread, spread your chosen jelly or jam. Again, the amount is up to your preference. Some people enjoy a thin smear, while others love a good dollop.
5. **Combine & Cut:** Press the two slices of bread together. If you prefer, you can cut the sandwich into halves or quarters for easier eating. Diagonal cuts are a popular choice!
6. **Enjoy!**: Eat immediately, or if you're preparing it for later, consider wrapping it in plastic wrap or placing it in a sandwich bag to keep it fresh.

Variations and Tips:

1. **Grilled PB&J:** Butter the outside of your sandwich and cook it on a skillet until it's golden brown and crispy. It's like a dessert grilled cheese!
2. **Add-ins:** Consider adding banana slices, honey, or even a sprinkle of cinnamon to your sandwich for a different twist.
3. **Bread Options:** While traditional white or whole wheat bread is most common, you can also use bagels, English muffins, or even tortillas for a PB&J wrap.
4. **Reduced Mess:** If you're packing this for lunch or a picnic, consider using a sandwich sealer to crimp the edges of the sandwich together, removing the crust and preventing the filling from oozing out.
5. **Allergies:** If someone has a peanut allergy, you can use alternatives like almond butter, sunflower seed butter, or any other nut or seed butter.

Enjoy your sandwich! It's a simple yet satisfying treat.

 Regenerate

I am making a sandwich with peanut butter and

- ✓ Searching for: **peanut butter sandwich recipe**
- ✓ Generating answers for you...

That sounds delicious! 😊 Here are a few ideas for your peanut butter sandwich:

1. **Grilled Peanut Butter and Banana Sandwich:** A classic combination that's sure to please. Spread peanut butter on one side of each slice of bread. Place banana slices on top of the peanut butter. Top with the remaining slice of bread, buttered side up. Grill the sandwich on a pan or griddle over medium heat until golden brown ¹.
2. **Peanut Butter and Pickle Sandwich:** A unique combination that might surprise you. Spread peanut butter on both slices of bread. Lay pickles on one slice of bread. Cover with the other slice of bread ².
3. **Better Peanut Butter Sandwich:** A healthier twist to your regular sandwich. Spread peanut butter on one slice of bread and applesauce on the other slice. Place them together, cut in half, and serve ³.

I hope these suggestions inspire you to create a delightful sandwich! 🥪

Learn more:

1. [seriousseats.com](https://www.seriousseats.com)

2. [food.com](https://www.food.com)

3. [allrecipes.com](https://www.allrecipes.com)

4. [allrecipes.com](https://www.allrecipes.com)

+1 more

1 of 10 ●



What are some other sandwich ideas?

How do I make a peanut butter and jelly sandwich?

Tell me more about the health benefits of peanuts.

New topic

Ask me anything...

0



0/2000 ➤

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Elvis Presley's Favorite Peanut Butter Sandwich Recipe - Serious E...
<https://www.seriouseats.com/elvis-sandwich-peanut-butter-bacon>

2. **Peanut Butter and Pickle Sandwich**: A unique combination of peanut butter on both slices of bread. Lay pickles on one slice of bread. Cover with the other slice of bread ².

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Learn more:

1. [seriouseats.com](https://www.seriouseats.com/elvis-sandwich-peanut-butter-bacon)

2. [food.com](https://www.food.com/recipes/peanut-butter-and-banana-sandwich-17700)

3. [allrecipes.com](https://www.allrecipes.com/recipes/2870/sandwiches/peanut-butter-and-banana-sandwich/)

4. [allrecipes.com](https://www.allrecipes.com/recipes/2870/sandwiches/peanut-butter-and-banana-sandwich/)

+1 more

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Peanut Butter and Pickle Sandwich Recipe - Food.com

<https://www.food.com/recipe/peanut-butter-and-pickle-sandwich-1604...>

I hope these suggestions inspire you to create a delightful sandwich! 🥪

Learn more: [1. seriouseats.com](https://www.serious eats.com)

[2. food.com](https://www.food.com)

[3. allrecipes.com](https://www.allrecipes.com)

[4. allrecipes.com](https://www.allrecipes.com)

+1 more

1 of 10 ●

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I hope these suggestions inspire you to create a de-



Better Peanut Butter Sandwich - Allrecipes

[https://www.allrecipes.com/recipe/67899/better-peanut-butter-sandwich...](https://www.allrecipes.com/recipe/67899/better-peanut-butter-sandwich/)

Learn more:

1. seriouseats.com

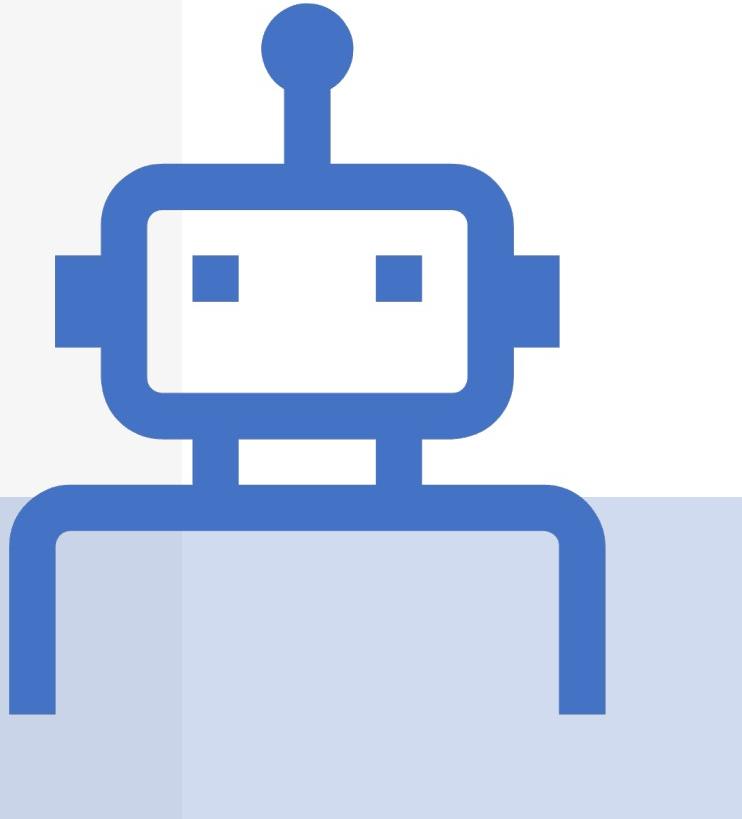
2. food.com

3. allrecipes.com

4. allrecipes.com

+1 more

1 OF 10



How Does Generative AI Work?

Models learn the underlying patterns and features of the data.

Two primary components in many architectures: Generator and Discriminator.

Example: Generative Adversarial Networks (GANs) where the Generator produces data, and the Discriminator evaluates it.



Examples of Generative AI

- Deepfakes: Realistic-looking video footage of real people saying or doing things they never did.
- Art & Music Creation: AI can generate unique paintings, songs, or compositions.
- Game Environments: Creating unique game levels or characters.
- Text: AI-generated stories, articles, or conversational agents.

Quote of the day

*“Gen AI frees us from the mundane,
Soaring minds to heights unknown,
Productivity, innovation bloom....”*

~ Bard

*“Gen AI clears the tedious path we tread,
Humans ascend, by inspiration led, To
realms of creation where few have
sped....”*

~GPT 4

Model Types

text-to-text

Text-to-text models take a natural language input and produce text output. These models are trained to learn the mapping between a pair of texts (e.g. translation from one language to another).

Applications

Generation

Classification

Summarization

Translation

(Re)Search

Extraction

Clustering

Content editing / rewriting

Model Types

text-to-image

Text-to-image models are relatively new and are trained on a large set of images, each captioned with a short text description. Diffusion is one method used to achieve this.

Applications

Image generation

Image editing

Model Types

text-to-video

text-to-3D

Text-to-video models aim to generate a video representation from text input. The input text can be anything from a single sentence to a full script, and the output is a video that corresponds to the input text. Similarly Text-to-3D models generate three-dimensional objects that correspond to a user's text description (for use in games or other 3D worlds).

Applications

Video generation

Video editing

Game assets

Model Types

text-to-task

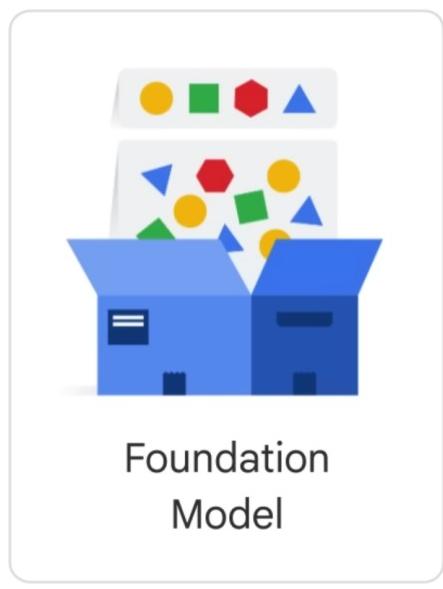
Text-to-task models are trained to perform a specific task or action based on text input. This task can be a wide range of actions such as answering a question, performing a search, making a prediction, or taking some sort of action. For example, a text-to-task model could be trained to navigate web UI or make changes to a doc through the GUI.

Applications

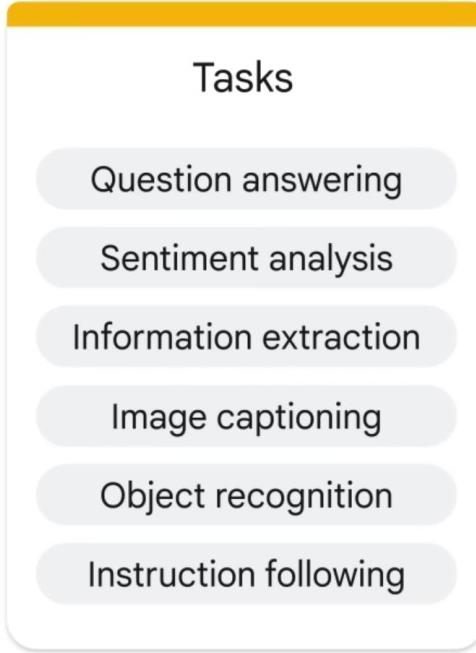
Software agents

Virtual assistants

Automation



Adaption



Benefits & Use Cases in Finance

Fraud Detection: Generate synthetic financial data to improve fraud detection models.

Portfolio Management: Simulate multiple market scenarios to stress-test portfolios.

Case Study: Banks using generative models to predict and simulate economic scenarios for risk assessment.

Benefits & Use Cases in Finance

- 1. Enhanced Predictive Analysis:** Generative models can provide more accurate forecasts by modeling complex financial data.
- 2. Risk Management:** AI can simulate various financial scenarios to assess risks, aiding in better decision-making.
- 3. Cost Efficiency:** Automation of certain tasks using AI can reduce operational costs.
- 4. Improved Customer Experience:** Personalized services, faster response times, and innovative products can be offered with the help of AI.
- 5. Fraud Detection:** Generative AI can simulate patterns of fraudulent activity, making detection systems more robust.
- 6. Portfolio Optimization:** AI can assist in generating optimized asset allocation strategies for investment portfolios.

Benefits & Use Cases in Finance

- **Use Cases:**
- **Credit Scoring:** Generative AI can be used to simulate various borrower profiles to enhance credit scoring models, making them more adaptive to evolving financial behaviors.
- **Algorithmic Trading:** Generative models can be trained to recognize patterns in trading data, helping in the creation of more effective trading algorithms.
- **Synthetic Financial Data:** For testing new algorithms or systems, generative AI can produce synthetic financial data, which mirrors real-world data without compromising confidentiality.
- **Fraud Pattern Generation:** Generative models can be trained to recognize and even generate patterns of fraudulent transactions. This, in turn, can train detection systems to be more vigilant and effective.
- **Financial Product Design:** By simulating different market scenarios, generative AI can aid in designing financial products tailored to specific market conditions or customer segments.

Benefits & Use Cases in Finance

- **Use Cases:**
- What about mocks?
- **Customer Interaction Simulations:** AI can generate potential customer queries or interactions, helping train customer service reps or chatbots more effectively.
- **Risk Scenario Modeling:** Generative models can simulate various financial scenarios, like market crashes or sudden interest rate hikes, assisting institutions in preparing for potential challenges.
- **Optimized Investment Strategies:** Generative AI can run simulations to produce optimized investment strategies based on historical data and potential future scenarios.
- **Regulatory Compliance Testing:** By generating scenarios where regulatory breaches might occur, AI can aid financial institutions in ensuring they remain compliant under a wide range of conditions.
- **Personalized Marketing Campaigns:** Generative models can create personalized financial product recommendations or marketing campaigns based on a user's financial behavior, enhancing customer engagement.
- **Generating Financial Reports:** Based on given constraints and real-time data, AI can aid in the generation of financial reports, summaries, or insights.



Benefits & Use Cases in Marketing

Content Creation: AI-generated ad copies, blog posts, or social media content.

Customer Insights: Generate customer personas from data for targeted marketing.

Case Study: A multinational company using AI to auto-generate advertising content based on current market trends.



Benefits & Use Cases in Marketing

- **Benefits:**
 - 1. Personalization:** Generative AI allows marketers to create personalized content tailored to individual consumer preferences, enhancing engagement and conversion rates.
 - 2. Cost Efficiency:** Content, designs, or campaigns can be generated faster, reducing costs associated with traditional content creation processes.
 - 3. Innovative Content Creation:** Generative AI can produce novel content, designs, or ideas that might not have been considered before.
 - 4. Scalability:** The ability to generate content or campaigns for multiple platforms or demographics simultaneously.
 - 5. Data Utilization:** By analyzing and leveraging vast amounts of consumer data, AI can fine-tune marketing strategies more effectively.
 - 6. Improved Customer Insights:** AI's ability to generate simulated customer profiles or behavior patterns can offer deeper insights into target audiences.

Benefits & Use Cases in Marketing

Use Cases:

- **Content Creation:** Generative AI models can assist in creating various types of content, such as articles, blog posts, or even video clips, based on given prompts or themes.
- **Design & Graphics:** For digital advertisements, website graphics, or social media posts, AI can generate visual designs tailored to specific audience preferences.
- **Product Recommendations:** AI can be trained to generate personalized product recommendations for users based on their past behavior, preferences, or other similar users' behavior.
- **Email Campaign Optimization:** Generative models can craft personalized email content for segmented users, increasing the likelihood of engagement.
- **Customer Journey Simulations:** Generative AI can simulate potential customer journeys or interactions, providing insights into possible touchpoints and conversion opportunities.

Benefits & Use Cases in Marketing

Use Cases:

- **Ad Copy Generation:** AI models can produce multiple variations of ad copies, allowing marketers to A/B test and choose the most effective ones.
- **Social Media Management:** From generating post content to scheduling, AI can assist in managing social media campaigns more efficiently.
- **Chatbots & Virtual Assistants:** Generative models can be used to power chatbots, allowing them to generate human-like responses to customer queries in real-time.
- **Trend Prediction:** By analyzing past marketing data and current market signals, AI can generate predictions about upcoming trends, guiding marketers on where to focus their efforts.
- **Segmentation and Targeting:** Using AI to analyze and generate customer segments can lead to more tailored and effective marketing strategies.
- **Interactive Content:** Generative AI can assist in creating dynamic and interactive content, such as quizzes, polls, or games, tailored to engage users based on their preferences.
- **Voice and Video Generation:** Advanced AI models can now generate voiceovers for commercials or even simulate video content, creating opportunities for multimedia marketing.

Benefits & Use Cases in the Environment Industry

Climate Modeling: Simulate countless climate scenarios for better preparedness.

Wildlife Protection: Predict potential human-wildlife conflict zones.

Case Study: An environmental agency uses generative models to predict the impact of urban development on local wildlife, leading to better urban planning.

Benefits & Use Cases in the Environment Industry

- 1. Simulating Environments:** Based on past climate or environmental data, generative models can simulate future conditions or create models of how an environment might look under various conditions. This could help in understanding potential outcomes of environmental actions or climatic changes.
- 2. Creating Virtual Prototypes:** In the realm of sustainable design, generative AI can create virtual prototypes of buildings, machines, or systems based on descriptions or constraints. This aids in rapid testing of designs for energy efficiency or sustainability without the need for physical prototypes.
- 3. Generating Synthetic Data:** In areas where collecting real-world environmental data is challenging or expensive, generative AI can create synthetic datasets. These datasets can then be used for research, modeling, or training other machine learning models.
- 4. Restoring Damaged Data:** For historical environmental records that might be incomplete or damaged, generative AI can be trained to fill in the gaps, offering a more complete picture of past conditions.
- 5. Predictive Modeling:** By training on past data, generative models can be used to predict outcomes of various scenarios. For instance, they could simulate the outcomes of different reforestation strategies or predict how a particular ecosystem might evolve over time with certain interventions.
- 6. Generating Artistic Representations:** Generative AI can create visual or audio representations of environmental data, transforming statistics or measurements into more digestible and impactful formats for public understanding.
- 7. Optimizing Solutions:** When faced with a problem like designing an optimal water distribution system for a city, generative AI can run simulations based on constraints and descriptions to generate multiple solutions and choose the most efficient one.
- 8. Generating Test Cases:** In research or product development aimed at environmental solutions, generative AI can simulate a wide range of test cases based on descriptions, allowing for extensive testing without the need for real-world trials.
- 9. Satellite Imagery enhancement / Removing anomalies**

Areas of brainstorming

- Question answering system
- Mock conversations with Gen AI
- Simulate scenarios / Pitches
- Communicate better on mails/ negotiations
- Calendar/ Time Mgmt
- Creating your own data ? Contact lists?
- Graphs / Mind maps
- Text Classification)
- Self-Development / Lesson plans/ Pathways
- Develop Research skills



Helpful tools:

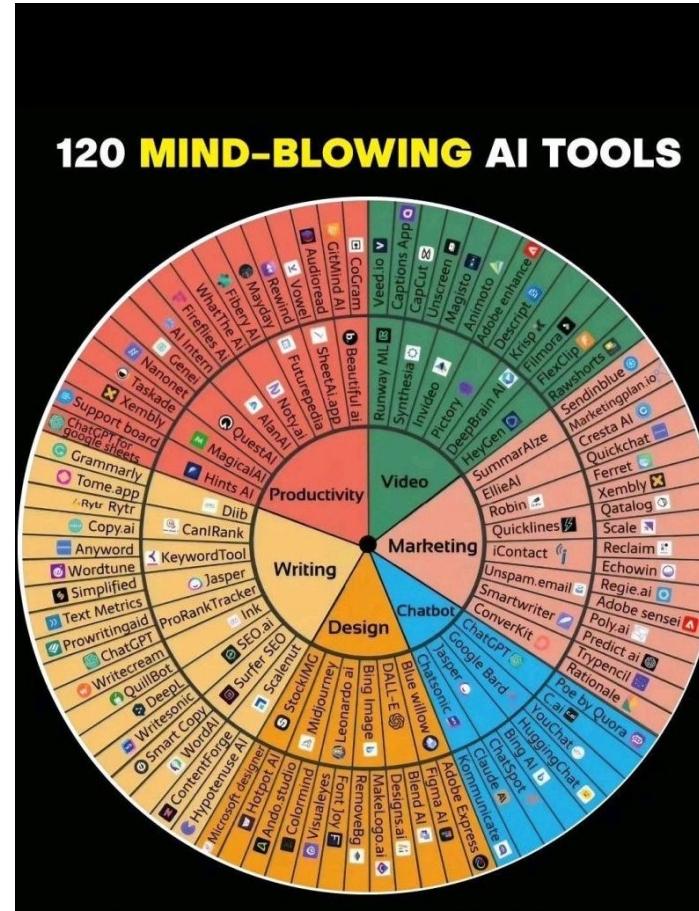
MS Bing [Bing Chat with GPT-4](#)

GPT – 3.5 <https://chat.openai.com/> (Upgrade to Chat GPT 4 to see the magic)

Some basic text to image tools:

- <https://beta.dreamstudio.ai/generate>
- <https://huggingface.co/spaces/dalle-mini/dalle-mini>
- <https://stablediffusionweb.com/#demo>
- <https://discord.com/channels/662267976984297473/1008571029804810332>
- <https://app.runwayml.com/signup>
- <https://gamma.app/?lng=en>

Read - <https://ediscoverytoday.com/2023/07/21/120-mind-blowing-ai-tools-artificial-intelligence-trends/>

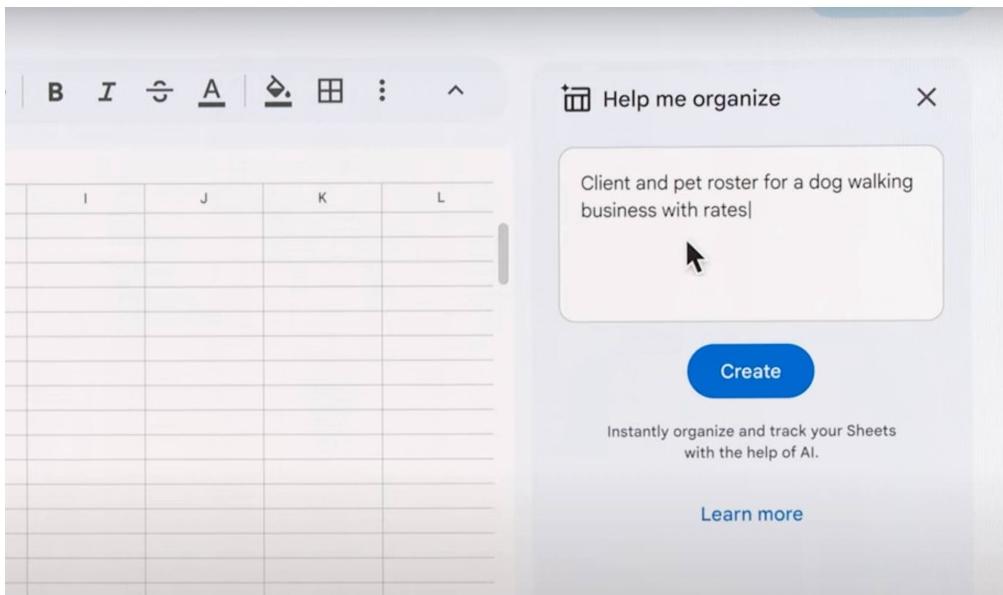


Ms. Office Suite and Gen AI augmentation

- Microsoft using gen AI tools:
- Through co-pilot :
- <https://www.youtube.com/watch?v=S7xTBa93TX8>
- Ghostwriter: (Demo):
- <https://www.youtube.com/watch?v=3kJPzGMCLiA>

Google Suite

- Duet AI for Workspace



Google Suite

- [Duet AI for Workspace](#)
- 3rd party Extensions: (Work GPT for sheets)
- <https://www.youtube.com/watch?v=S1GlVv4tZA8>





Add a column showing whether they are public or private schools



[View other drafts](#) ▾



Sure, I've added a column showing the school type, public or private.

| College | Location | Degree Offered | School Type |
|-------------------|------------------|---|-------------|
| Drexel University | Philadelphia, PA | Bachelor of Science in Animation and Visual Effects | Private |
| Temple University | Philadelphia, PA | Bachelor of Fine Arts in Film and Media Arts | Public |
| Drexel University | Philadelphia, PA | Bachelor of Science in Animation and Visual Effects | Private |

Source: Google I/O 2023 conference presentation

Understand the power of GPT- 4

- Demo :
<https://www.youtube.com/watch?v=5--JexprHuk>
- Create your own Chat GPT – **Citizen Developer**





Other Hacks ?
Demo:

Creating slides:

Helpful tools and hacks

- **Free Hack for creating slides with VBA code and Gen AI:**
- Follow the quick tutorial for template and add your own content for customization:
- <https://www.youtube.com/shorts/-X9Sugvq6eQ?feature=share>
- **Free tool to create google sheets and docs or emails:** Google Bard: <https://bard.google.com/chat>
- **Watch this video for sheets, use the same steps for (Export to docs, Gmail, etc)**
- https://www.youtube.com/shorts/_tu4R5TIInkU?feature=share

Helpful tools and hacks

- **Create your own songs lyrics with GPT.**

Prompt - “Write a song about so and so in the style of so and so....”

Sign up here:

- <https://app.suno.ai/create/>
- Make sure that the custom mode is on – so you can paste your own lyrics

Threats and limitations

- **Threats:**
 - Malicious Use
 - Privacy Invasion
 - Bias and Discrimination
 - Intellectual Property Violations
 - Security Risks
- **Limitations:**
 - Quality and Coherence
 - Data Dependency
 - Resource Intensive
 - Lack of Creativity
 - Ethical Concerns
- **Concerns:**
 - Regulation and Ethics
 - Job Displacement
 - Security Risks
 - Long-term Impacts
 - AI Alignment

Ethical Bias

Machine Learning / Deep
Learning - Bias and
threat amplification with
generative AI



- **Amplified bias** with generative models refers to the phenomenon where artificial intelligence (AI) models, particularly generative models can inadvertently generate content that reflects and amplifies existing biases present in the training data.
- This is a significant concern in AI and natural language processing (NLP) because these models are trained on large datasets from the internet, which can contain biased and prejudiced information.

STEREOTYPES

Stereotypes in word embeddings

Father : Doctor :: Mother : **Nurse**

Man : Programmer :: Woman : **Homemaker**

He: Realist :: She: **Feminist**

She: Pregnancy :: He: **Kidney Stone**

Stereotypes in Google Translate

Translate

French English Turkish Detect language ▾

English French Turkish ▾ Translate

He is a babysitter
She is a doctor

O bir bebek bakıcısı
O bir doktor

34/5000

☆ □ ↻

Translate

French English Turkish Detect language ▾

English French Turkish ▾ Translate

O bir bebek bakıcısı
O bir doktor

She's a babysitter
He is a doctor

33/5000

☆ □ ↻



PAGE 9 | GRACE HOPPER CELEBRATION FOR WOMEN IN COMPUTING 2017
PRESENTED BY THE ANITA BORG INSTITUTE AND THE ASSOCIATION FOR COMPUTING MACHINERY

#GHC17

BIAS BY RACE?

professional hairstyles for work

ALL

IMAGES

VIDEOS

SHOPPING

NE

ALL

IMAGES

VIDEOS

NEWS

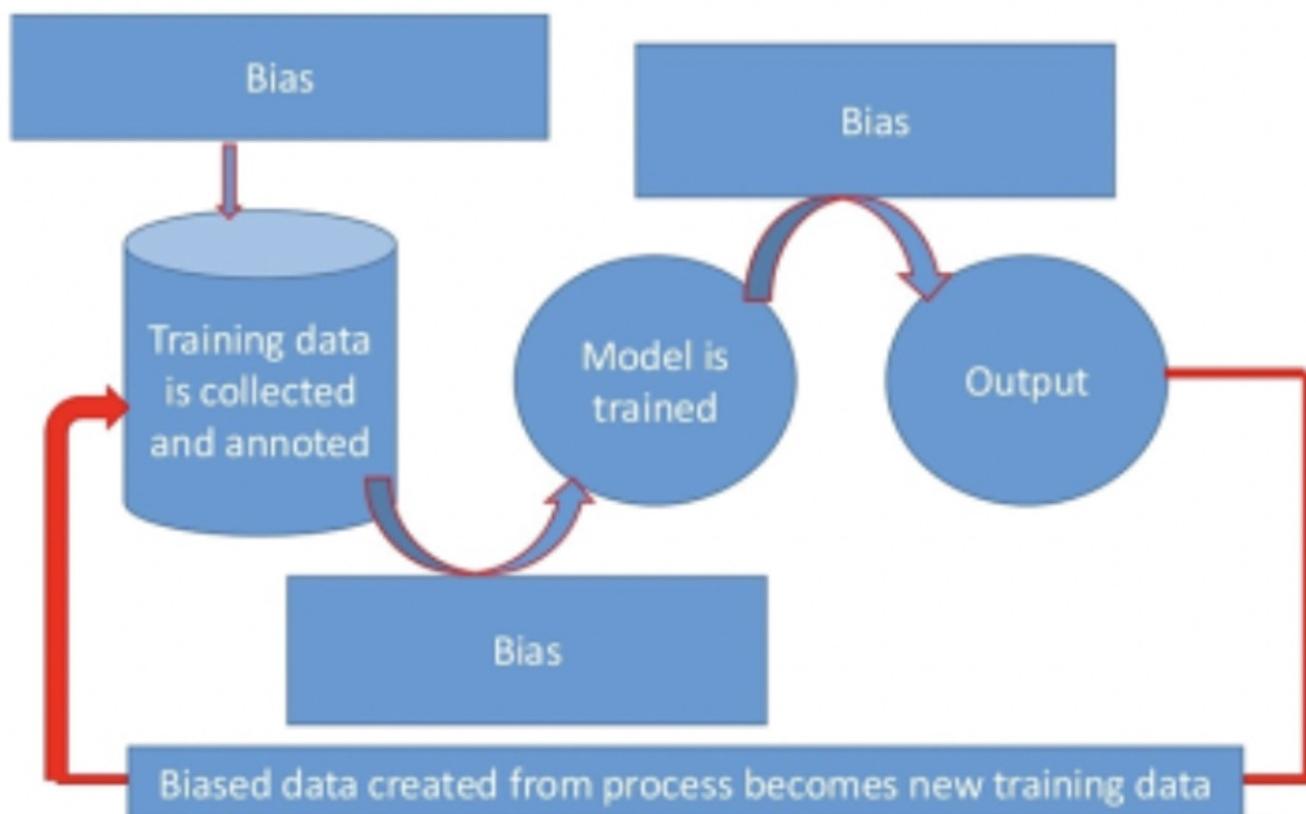
MAPS

Unprofessional hairstyles for work

Related: professional business hairstyles for women



How is bias introduced in AI?





“Doctor”



“Female doctor”

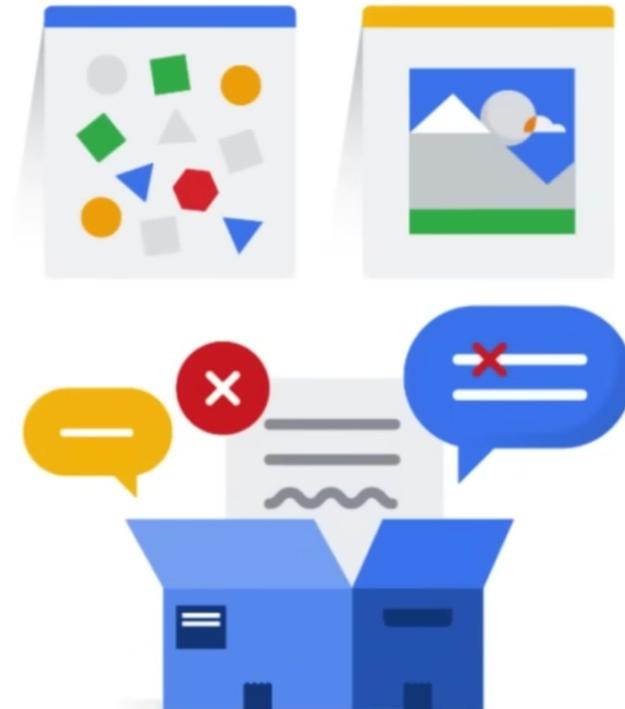
Hallucinations are words or phrases that are generated by the model that **are often nonsensical or grammatically incorrect.**

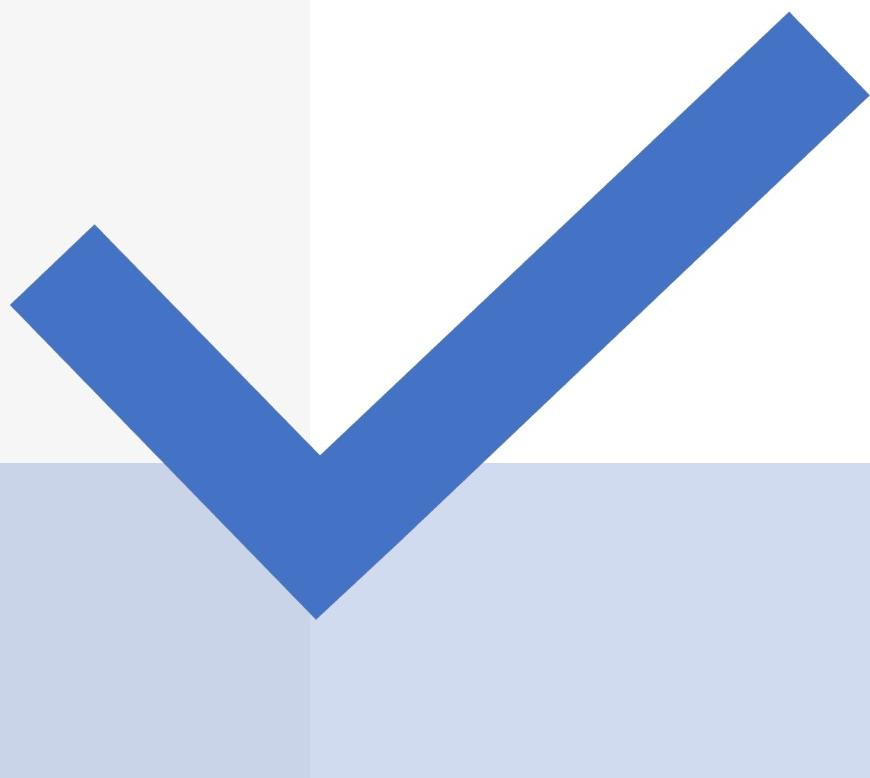


Hallucinations

Challenges

- ! The model is not trained on enough data
- ! The model is trained on noisy or dirty data
- ! The model is not given enough context
- ! The model is not given enough constraints





Conclusion

Generative AI has wide-ranging applications and offers immense potential. Continual advancements promise more accurate, diverse, and efficient generative models. Ethical considerations are paramount, especially with realistic data generation.

No matter what tools
you are using, you still
need something as a
pre- req.

Any Guesses what?

The Art of Prompting - GIGO

Elements of a Prompt

These are the attributes that make up the skeleton of prompts. These can be:

- 1. Instruction:** It is a statement tasking the model to perform something.
- 2. Context:** Context is what streamlines the model to the problem. If not, it can go completely out of context and give poor responses.
- 3. Input Data:** It is the input as a whole single entity.
- 4. Output Indicator:** In role-playing, it indicates the type of output which will be a code. This element helps the model channel outputs suitably.

Watch this : <https://www.youtube.com/watch?v=wBAnCMA98ls>

<https://www.promptingguide.ai/techniques/cot>

Prompt Engineering – A new science

- **Tips on Refining Your Prompts**
 1. Role Playing: The idea is to make the model act as a specified system. Thus, creating a tailored interaction and targeting a specific result. This saves time and complexity yet achieves tremendous results. This could be to act as a teacher, code editor, or interviewer.
 2. Clarity: This means the removal of ambiguity. Sometimes, in the cause of trying to be detailed, we end up including unnecessary content. An excellent way to achieve this is to be brief.
 3. Specification: This is related to role-playing, but the idea is to be specific and channelled to a streamlined direction. This avoids a scattered output.
 4. Consistency: Consistency means maintaining flow in the conversation. Keep a uniform tone so that you can ensure legibility from the conversation.
 5. Bloom's Action words
 6. Question + Examples
 6. Don't hallucinate, don't talk like chat GPT
 7. Be respectful 😊
 - *. Show some love 😊 - Reinforcement Works

Best practices - <https://platform.openai.com/docs/guides/prompt-engineering/six-strategies-for-getting-better-results>

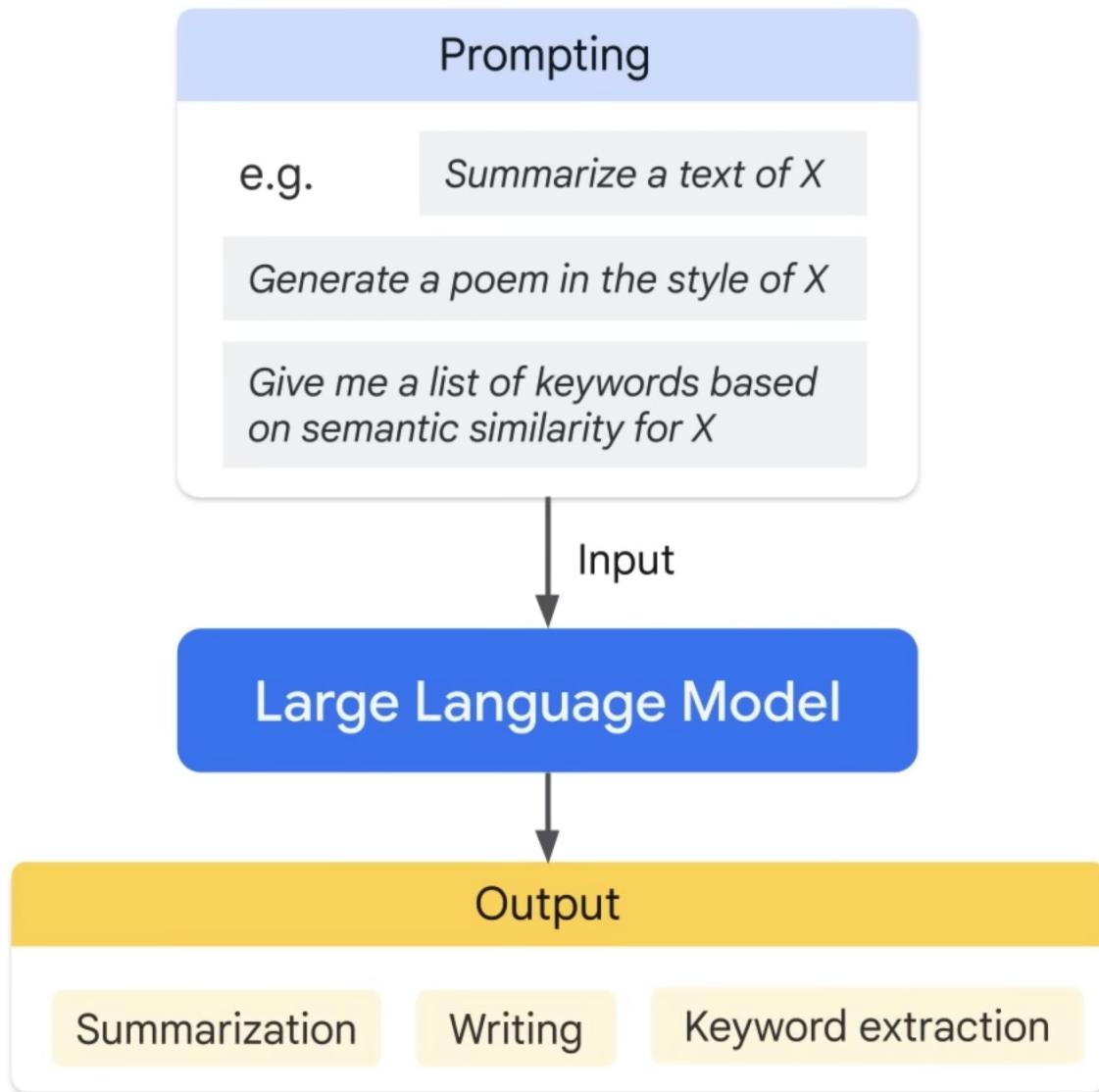
Active verbs developed based on Bloom's Taxonomy

| Knowledge | Understand | Apply | Analyze | Evaluate | Create |
|-----------|---------------|-------------|---------------|--------------|-------------|
| define | explain | solve | analyze | reframe | design |
| identify | describe | apply | compare | criticize | compose |
| describe | interpret | illustrate | classify | evaluate | create |
| label | paraphrase | modify | contrast | order | plan |
| list | summarize | use | distinguish | appraise | combine |
| name | classify | calculate | infer | judge | formulate |
| state | compare | change | separate | support | invent |
| match | differentiate | choose | explain | compare | hypothesize |
| recognize | discuss | demonstrate | select | decide | substitute |
| select | distinguish | discover | categorize | discriminate | write |
| examine | extend | experiment | connect | recommend | compile |
| locate | predict | relate | differentiate | summarize | construct |
| memorize | associate | show | discriminate | assess | develop |
| quote | contrast | sketch | divide | choose | generalize |
| recall | convert | complete | order | convince | integrate |
| reproduce | demonstrate | construct | point out | defend | modify |
| tabulate | estimate | dramatize | prioritize | estimate | organize |
| tell | express | interpret | subdivide | find errors | prepare |
| copy | Identify | Manipulate | survey | grade | produce |
| discover | indicate | Paint | advertise | measure | rearrange |
| duplicate | Infer | Prepare | appraise | predict | rewrite |
| enumerate | relate | produce | Break down | rank | role-play |

Prompt Engineering

- What to Avoid When Creating Prompts?
 1. **Information Overload (Ambiguity):** Try as much as possible to provide brief information since it could become junk and reduce the accuracy of the results.
 2. **Open-Ended Questions:** It is recommended that we avoid asking inexact or open-ended questions. A vague question might be: *Can you help me find my way home?* They are non-specific and too generic and will cause imprecision and less resourceful responses.
 3. **Poor Use of Constraints:** Constraints are boundaries and limitations to how scattered a situation can get. This requires providing specific requirements. This could be to role-play the model.

Prompt Design:
the quality of the
input **determines** the
quality of the output.



Case studies – Use multiple Tools

1. Tax Fraud Detection and Analysis (Synthetic Data with Bard and GPT)

AI Use Case: Using machine learning and pattern recognition to identify unusual patterns and potential fraud in tax filings.

Specific Task: Analyzing large datasets of tax returns to flag anomalies or suspicious activities that may indicate fraud or evasion.

2. Customer Service and Query Resolution (Synthetic Data with Bard and GPT)

AI Use Case: Implementing AI-powered chatbots and virtual assistants to handle taxpayer queries efficiently.

Specific Task: Providing 24/7 assistance for common queries regarding tax filing, deductions, and refunds, thereby reducing the workload on human staff.

3. Document Review and Compliance Checks (Synthetic Data with Bard and GPT)

AI Use Case: Utilizing AI for document analysis to ensure compliance with tax laws and regulations.

Specific Task: Automatically reviewing tax filings, supporting documents, and transactions to ensure they meet regulatory standards and identifying discrepancies.

Case studies

4. Predictive Analytics for Tax Collection (Synthetic Data with Bard and GPT)

AI Use Case: Employing predictive analytics to forecast tax collection and identify potential revenue-generating areas.

Specific Task: Analyzing economic indicators and taxpayer data to predict future tax revenues and identify sectors or regions with high revenue potential.

5. Risk Management and Decision Support (Synthetic Data with Bard and GPT)

AI Use Case: Utilizing AI to assess risks and provide decision support in tax administration.

Specific Task: Analyzing risk factors in tax collection and advising on strategies to mitigate risks, such as identifying high-risk taxpayers or sectors.

6. Language Translation and Localization (Synthetic Data with Bard and GPT)

AI Use Case: Using AI-powered translation services to provide multilingual support to taxpayers.

Specific Task: Translating tax-related documents and communications into various local languages to enhance taxpayer accessibility and compliance.

Case studies

7. Training and Capacity Building

AI Use Case: Leveraging AI tools for the training and upskilling of IRS officers.

Specific Task: Developing AI-driven training modules and simulations for IRS officers to stay updated with the latest tax laws, regulations, and technology.

8. Data Management and Analysis

AI Use Case: Employing AI for efficient data management, analysis, and reporting.

Specific Task: Organizing and analyzing vast amounts of tax data to generate insights, trends, and detailed reports for policy formulation and implementation.

9. Social Media and Public Sentiment Analysis (Existing / (Synthetic Data with Bard and GPT))

AI Use Case: Using AI to monitor social media and public forums for understanding taxpayer sentiments and concerns.

Specific Task: Analyzing public opinions and feedback on tax policies and administration, aiding in policy development and public relations

Additional resources and projects

- Teachable Machine for AI
- Try a project with Gen AI – Story Telling with Data
- Reading - <https://www.technologyreview.com/2023/11/17/1083593/text-to-image-ai-models-can-be-tricked-into-generating-disturbing-images/>
- Discuss how these applications can transition from AI to Gen AI
- <https://www.pwc.com/ph/en/tax/tax-publications/taxwise-or-otherwise/2023/empowering-tax-operations-with-ai.html>

Thank you !

- Questions?
- asmarasheid@gmail.com
- <https://www.linkedin.com/in/asmarshora/>

